Subject index

Acadian, 271
accretion, 349
algebraic analysis, 739
alkali metasomatism, 769
amphibolite, 537
amphibolite to granulite facies, 415
anatexis, 537
apatite, 187
Archean, 145
Arunta Inlier, 655

biotite, 41
Black Forest, 449
blueschist, 615, 623

Cabo Ortegal, 751
calcsilicates, 91
Canadian Cordillera, 483
Ca-pyroxene, 41
central Southern Alps, 319
chemical equilibrium, 41
chlorite, 25, 615
chlorite geothermometry, 229
chloritoid, 25, 287
chloritoid/staurolite transition, 319
clockwise *P–T* path, 379
CNFMASH, 9
contact metamorphism, 259
continental crust, 301
coplanarity, 1
cordierite, 689
coronas, 91
coronitic metagabbro, 537
crustal cross-section, 157
crystallinity, 783

daphnite, 25
decompression, 127
deformation age, 573
deformation mechanisms, 709
deformation–metamorphism interaction, 319
dehydration-melting, 379
diapirs, 145
dihedral angles, 709
ductile shearing, 769

Eastern Ghats, 769
eclogite, 287, 537, 573, 593, 623
eclogites, 9, 639
Eo-Alpine high pressure metamorphism, 195
erosion, 349
Euler spheres, 435
European Variscides, 109
exhumation, 573
extension, 127, 593, 655

fault-related emplacement, 271
fluid, 783
fluid distribution, 673
fluid flow, 339
fluid inclusions, 173
fluid salinity, 187
FMAS granulites, 435
fold mechanisms, 211
folding, 367, 521
foliation development, 211, 521
fractures, 639

garnet, 41, 367, 727
garnet diffusion modelling, 449
garnet growth, 503
garnet nucleation, 503
garnet zoning, 537
gedrite, 769
geochronology, 109
geospeedometry, 449
geothermobarometry, 615
geothermometer, 25
Gondwana, 91, 593
granite–greenstone terranes, 145
granitoids, 157
granulite facies, 465
granulite, 655
granulites, 639
graphite, 783
Grenville Orogen, 465
Grenville Province, 537

H_2O availability, 9
heat production, 557
helicitic inclusions, 211
Hercynian low-pressure/high-temperature metamorphism, 157
high-grade metapelites, 379
high-pressure granulite, 557
high-pressure metamorphism, 109
high-*T* deformation, 127
hornblende, 41
humite-group minerals, 91
hydrothermal, 783
hydrothermal metamorphism, 339

integrated deformation and metamorphism, 521
intracratonic deformation, 557
intraplate deformation, 655
invariant points, 435

K-feldspar, 41
K-feldspar activity models, 195
KFMASH, 1
kinetics, 503
kinzigites, 449
kyanite, 145
kyanite eclogite, 127

Laramie Mountains, 259
low-grade metamorphism, 339

mass balance, 739
mass transport, 339
melt devolatilization, 379
metagreywackes, 415
metamorphic CO_2–N_2 fluids, 379
metamorphic fluids, 173, 187

© Blackwell Science Inc., 0263-4929/99/$14.00

metamorphic reaction, 739
metamorphism, 349, 483
metapelite, 689, 739
metaperidotite, 751
meta-peridotites, 301
metasomatism, 397
meteoric fluids, 397
microgranular kyanite, 727
microstructure, 727
monazite, 483
Monviso, 287
Morocco, 25
Musgrave Block, 465, 557

Naxos, 301
New Caledonia, 9
Norway, 639

ophiolite, 287
order-disorder, 195
orogen, 301
orogeny, 349, 465
orthogneiss migmatite, 61
Otago Schist, 173, 187
oxygen bulk diffusion, 673
oxygen isotopes, 397

partial melt, 709
partial melting, 415
Petermann Orogeny, 557
petrofabric, 751
petrogenetic grids, 435, 689
petrological cooling rate, 449
phengite, 615
plagioclase, 41
pluton, 271
polymetamorphism, 689, 727
porphyroblast, 367
porphyroblast timing, 211
pseudomorph, 727
pseudosections, 9
P–T–deformation–time path, 319
P–T path, 623
P–T–t paths, 145, 689

radiogenic heat, 349
radius rate, 503
Rb–Sr and Sm–Nd isotopes, 259
Rb–Sr dating, 573
reaction, 1
regional metamorphism, 259
retro-metamorphism, 639
rheology, 751
Rodinia, 593
rotation, 367

salinity, 173
sapphirine, 127
Saxony, 109
scapolite, 91
shear zones, 397
SHRIMP U–Pb zircon dates, 465
Sierras Pampeanas, 415
Sm–Nd dating, 655
snowball garnet, 367
solid state annealing, 61
Southern Calabria, 157
spatial statistics, 503
staurolite, 689
stilpnomelane, 615
sulphur isotopes, 339
SVD technique, 739
syn-tectonic emplacement, 271

Taveyanne metagreywacke, 229
tectonic implications, 623
tectonic, 573
tectonics, 109
TEM–AEM analyses, 229
TEM characterization, 673
textural analysis, 61
thermobarometry, 537
Ti-clinohumite, 751
titanite, 483
trace elements (Rb, Cs, Sr, Ba, Sc, Y, lanthanides, Zr, Hf, V, Nb, Cr, Ni, Zn, Ga, Ge), 41

Ultramylonite, 673
U–Pb geochronology, 483

Variscan, 319
Vermont, 271
very low-grade metamorphism, 229

Western Alps, 195
Western Gneiss Region, 639
western Tianshan, 623

Zambezi Belt, 593

Author index

Ábalos, B. *see* Gil Ibarguchi, J. I.
Alonso-Azcárate, J., Rodas, M., Bottrell, S. H., Raiswell, R., Velasco, F. & Mas, J. R. Pathways and distances of fluid flow during low-grade metamorphism: evidence from pyrite deposits of the Cameros Basin, Spain, 339
Austrheim, H. *see* Straume, Á. K.
Avigad, D. *see* Katzir, Y.
Azcarraga, J. *see* Gil Ibarguchi, J. I.

Battaglia, D. *see* Spalla, M. I.
Bell, T. H. & Hickey, K. A. Complex microstructures preserved in rocks with a simple matrix: significance for deformation and metamorphic processes, 521
Bell, T. H. *see* Hickey, K. A.
Bottrell, S. H. *see* Alonso-Azcárate, J.
Bousquet, R. *see* Vidal, O.
Bruce, V. *see* Gleason, G. C.
Buick, I. S. *see* Cartwright, I.

Campbell, J. L. *see* Kretz, R.
Carminati, E. *see* Spalla, M. I.
Carson, C. J., Powell, R. & Clarke, G. L. Calculated mineral equilibria for eclogites in CaO–Na_2O–FeO–MgO–Al_2O_3–SiO_2–H_2O: application to the Pouébo Terrane, Pam Peninsula, New Caledonia, 9
Carswell, D. A. *see* Rötzler, J.
Cartwright, I. & Buick, I. S. The flow of surface-derived fluids through Alice Springs age middle-crustal ductile shear zones, Reynolds Range, central Australia, 397
Ceriani, S. *see* Spalla, M. I.
Cesare, B. Multi-stage pseudomorphic replacement of garnet during polymetamorphism: 1. Microstructures and their interpretation, 727
Cesare, B. Multi-stage pseudomorphic replacement of garnet during polymetamorphism: 2. Algebraic analysis of mineral assemblages, 739

Chamberlain, K. R. *see* Patel, S. C.
Cheney, J. T. *see* Pattison, D. R. M.
Clarke, G. L. *see* Carson, C. J.
Clarke, G. L. *see* White, R. W.
Cliff, R. A. *see* Reddy, S. M.
Close, D. *see* Scrimgeour, I.
Collins, W. J. & Van Kranendonk, M. J. Model for the development of kyanite during partial convective overturn of Archean granite–greenstone terranes: the Pilbara Craton, Australia, 145
Cox, R. A. & Indares, A. Transformation of Fe–Ti gabbro to coronite, eclogite and amphibolite in the Baie du Nord segment, Manicouagen Imbricate Zone, eastern Grenville Province, 537
Crowley, J. L. & Parrish, R. R. U-Pb isotopic constraints on diachronous metamorphism in the northern Monashee complex, southern Canadian Cordillera, 483
Currie, K. L. & Van Staal, C. R. The assemblage stilpnomelane–chlorite–phengitic mica: a geothermobarometer for blueschist and associated greenschist terranes, 615

Dallain, C., Schulmann, K. & Ledru, P. Textural evolution in the transition from subsolidus annealing to melting process, Velay Dome, French Massif Central, 61
Daniel, C. G. & Spear, F. S. The clustered nucleation and growth processes of garnet in regional metamorphic rocks from northwest Connecticut, USA, 503
Dasgupta, S., Sengupta, P., Sengupta, Pr., Ehl, J. & Raith, M. Petrology of gedrite-bearing rocks in mid-crustal ductile shear zones from the Eastern Ghats Belt, India, 769
Demichelis, A. H. *see* Otamendi, J. E.
Dirks, P. H. G. M. & Sithole, T. A. Eclogites in the Makuti gneisses of Zimbabwe: implications for the tectonic evolution of the Zambezi Belt in southern Africa, 593

Ehl, J. *see* Dasgupta, S.
Essene, E. J. *see* Tropper, P.
Evans, B. W. *see* Katzir, Y.

Farver, J. R. & Yund, R. A. Oxygen bulk diffusion measurements and TEM characterization of a natural ultramylonite: implications for fluid transport in mica-bearing rocks, 673
Foden, J. *see* Mawby, J.
Frey, M. *see* Schmidt, D.
Frost, B. R. *see* Patel, S. C.
Frost, B. R. *see* Patel, S. C.
Frost, C. D. *see* Patel, S. C.

Gao, J., Klemd, R., Zhang, L., Wang, Z. & Xiao, X. *P–T* path of high-pressure/low-temperature rocks and tectonic implications in the western Tianshan Mountains, NW China, 623
Garfunkel, Z. *see* Katzir, Y.
Gerstenberger, H. *see* Rötzler, J.
Gil Ibarguchi, J. I., Ábalos, B., Azcarraga, J. & Puelles, P. Deformation, high-pressure metamorphism and exhumation of ultramafic rocks in a deep subduction collision setting (Cabo Ortegal, NW Spain), 751
Gleason, G. C., Bruce, V. & Green, H. W. Experimental investigation of melt topology in partially molten quartzo-feldspathic aggregates under hydrostatic and non-hydrostatic stress, 709
Goffé, B. *see* Vidal, O.
Graeßner, T. & Schenk, V. Low-pressure metamorphism of Palaeozoic pelites in the Aspromonte, southern Calabria: constraints for the thermal evolution in the Calabrian crustal cross-section during the Hercynian orogeny, 157
Green, H. W. *see* Gleason, G. C.
Guiraud, M. *see* Powell, R.

Hand, M. *see* Mawby, J.
Hannula, K. A., Lackey, J. S., Mattox, E., McGrath, G., Onasch, E. & Wertheim, J. Syn-tectonic pluton intrusion during contractional deformation: microstructural and metamorphic evidence from the aureole of the Acadian Victory Pluton, northeastern Vermont, USA, 271
Hartree, R. *see* Kretz, R.
Hasse, G. *see* Rötzler, J.
Hickey, K. A. & Bell, T. H. Behaviour of rigid objects during deformation and metamorphism: a test using schists from the Bolton syncline, Connecticut, USA, 211
Hickey, K. A. *see* Bell, T. H.
Hodges, K. V. *see* Huerta, A. D.
Hoffman, E. L. *see* Kretz, R.
Horn, E. E. *see* Janák, M.
Huerta, A. D., Royden L. H. & Hodges, K. V. The effects of accretion, erosion and radiogenic heat on the metamorphic evolution of collisional orogens, 349
Hunziker, J. C. *see* Tropper, P.
Hurai, V. *see* Janák, M.

Indares, A. *see* Cox, R. A.

Janák, M., Hurai, V., Ludhová, L., O'Brien, P. J. & Horn, E. E. Dehyrdration melting and devolatilization during exhumation of high-grade metapelites: the Tatra Mountains, Western Carpathians, 379
Jarick, J. *see* Weyer, S.
Jiang, D. *see* Williams, P. F.

Katzir, Y., Avigad, D., Matthews, A., Garfunkel, Z. & Evans, B. W. Origin and metamorphism of ultrabasic rocks associated with a subducted continental margin, Naxos (Cyclades, Greece), 301
Kienast, J. R. *see* Messiga, B.
Klemd, r. *see* Gao, J.
Kletetschka, G. & Stout, J. H. Stability analysis of invariant points using Euler spheres, with an application to FMAS granulites, 435
Kretz, R., Campbell, J. L., Hoffman, E. L., Hartree, R. & Teesdale, W. J. Approaches to equilibrium in the distribution of trace elements among the principal minerals in a high-grade metamorphic terrane, 41

Lackey, J. S. *see* Hannula, K. A.
Ledru, P. *see* Dallain, C.
Livi, K. J. T. *see* Schmidt, D.
Ludhová, L. *see* Janák, M.

Markl, G. *see* Piazolo, S.
Mas, J. R. *see* Alonso-Azcárate, J
Matthews, A. *see* Katzir, Y.
Mattox, E. *see* Hannula, K. A.
Mawby, J., Hand, M. & Foden, J. Sm–Nd evidence for high-grade Ordovician metamorphism in the Arunta Block, central Australia, 655
McGrath, G. *see* Hannula, K. A.
Messiga, B., Kienast, J. R., Rebay, G., Riccardi, M. P. & Tribuzio, R. Cr-rich magnesiochloritoid eclogites from the Monviso ophiolites (Western Alps, Italy), 287
Mezger, K. *see* Weyer, S.
Miller, R. B. *see* Whitney, D. L.
Möller, C. Sapphirine in SW Sweden: a record of Sveconorwegian (–Grenvillian) late-orogenic tectonic exhumation, 127

Nelson, D. R. *see* White, R. W.

O'Brien, P. J. *see* Janák, M.
Oliva, A. *see* Spalla, M. I.
Onasch, E. *see* Hannula, K. A.
Otamendi, J. E., Patiño Douce, A. E. & Demichelis, A. H. Amphibolite to granulite transition in aluminous greywackes from the Sierra de Comechingones, Córdoba, Argentina, 415

Pasteris, J. D. Causes of the uniformly high crystallinity of graphite in large epigenetic deposits, 783
Parra, T. *see* Vidal, O.
Parrish, R. R. *see* Crowley, J. L.
Patel, S. C., Frost, B. R., Chamberlain, K. R. & Snyder, G. L. Proterozoic metamorphism and uplift history of the north-central Laramie Mountains, Wyoming, USA, 243
Patel, S. C., Frost, C. D. & Frost, B. R. Contrasting responses of Rb–Sr systematics to regional and contact metamorphism, Laramie Mountains, Wyoming, USA, 259
Paterson, S. R. *see* Whitney, D. L.
Patiño Douce, A. E. *see* Otamendi, J. E.
Pattison, D. R. M., Spear, F. S. & Cheney, J. T. Polymetamorphic origin of muscovite + cordierite + staurolite + biotite assemblages: implications for the metapelitic petrogenetic grid and for *P–T* paths, 689
Piazolo, S. & Markl, G. Humite- and scapolite-bearing assemblages in marbles and calcsilicates of Dronning Maud Land, Antarctica: new data for Gondwana reconstructions, 91
Powell, R. & Guiraud, M. Can a reaction be written between a set of minerals within error?, 1
Powell, R. *see* Carson, C. J.
Puelles, P. *see* Gil Ibarguchi, J. I.

Raiswell, R. *see* Alonso-Azcárate, J.
Raith, M. *see* Dasgupta, S.
Rebay, G. *see* Messiga, B.
Reddy, S. M., Wheeler, J. & Cliff, R. A. The geometry and timing of orogenic extension: an example from the Western Italian Alps, 573
Riccardi, M. P. *see* Messiga, B.
Rodas, M. *see* Alonso-Azcárate, J.
Rötzler, J., Carswell, D. A., Gerstenberger, H. & Hasse, G. Transitional blueschist–epidote amphibolite facies metamorphism in the Frankenberg massif, Germany, and geotectonic implications, 109
Royden, L. H. *see* Huerta, A. D.

Schenk, V. *see* Graeßner, T.
Schmidt, D., Livi, K. J. T. & Frey, M. Reaction progress in chloritic material: an electron microbeam study of the Taveyanne greywacke, Switzerland, 229
Schulmann, K. *see* Dallain, C.
Scrimgeour, I. & Close, D. Regional high-pressure metamorphism during intracratonic deformation: the Petermann Orogeny, central Australia, 557
Sengupta, P. *see* Dasgupta, S.
Sengupta, Pr. *see* Dasgupta, S.
Sharp, Z. D. *see* Tropper, P.
Sithole, T. A. *see* Dirks, P. H. G. M.
Smith, M. P. & Yardley, B. W. D. Fluid evolution during metamorphism of the Otago Schist, New Zealand: (I) Evidence from fluid inclusions, 173
Smith, M. P. & Yardley, B. W. D. Fluid evolution during metamorphism of the Otago Schist, New Zealand: (II) Influence of detrital apatite on fluid salinity, 187
Snyder, G. L. *see* Patel S. C.
Spalla, M. I., Carminati, E., Ceriani S., Oliva, A. & Battaglia, D. Influence of deformation partitioning and metamorphic re-equilibration on *P–T* path reconstruction in the pre-Alpine basement of central Southern Alps (Northern Italy), 319
Spear, F. S. *see* Daniel, C. G.
Spear, F. S. *see* Pattison, D. R. M.
Stout, J. H. *see* Kletetschka, G.
Straume, Å. K. & Austrheim, H. Importance of fracturing during retro-metamorphism of eclogites, 639

Teesdale, W. J. *see* Kretz, R.
Tribuzio, R. *see* Messiga, B.
Tropper, P., Essene, E. J., Sharp, Z. D. & Hunziker, J. C. Application of K-feldspar–jadeite–quartz barometry to eclogite facies metagranites and metapelites in the Sesia Lanzo Zone (Western Alps, Italy), 195

Van Kranendonk, M. J. *see* Collins, W. J.
Van Staal, C. R. *see* Currie, K. L.
Velasco, F. *see* Alonso-Azcárate, J.
Vidal, O., Goffé, B., Bousquet, R. & Parra, T. Calibration and testing of an empirical chloritoid-chlorite Mg-Fe exchange thermometer and thermodynamic data for daphnite, 25

Wang, z. *see* Gao, J.
Wertheim, J. *see* Hannula, K. A.
Weyer, S., Jarick, J. & Mezger, K. Quntitative temperature-time information from retrograde diffusion zoning in garnet: constraints for the *P–T–t* history of the Central Black Forest, Germany, 449
Wheeler, J. *see* Reddy, S. M.
White, R. W., Clarke, G. L. & Nelson, D. R. SHRIMP U-Pb zircon dating of Grenville-age events in the western part of the Musgrave Block, central Australia, 465
Whitney, D. L., Miller, R. B. & Paterson, S. R. *P–T–t* evidence for mechanisms of vertical tectonic motion in a contractional orogen: north-western US and Canadian Cordillera, 75
Williams, P. F. & Jiang, D. Rotating garnets, 367

Xiao, x. *see* Gao, J.

Yardley, B. W. D. *see* Smith, M. P.
Yardley, B. W. D. *see* Smith, M. P.
Yund, R. A. *see* Farver, J. R.

Zhang, l. *see* Gao, J.